STRATEGY FOR RECOVERY

A core area represents the closest approximation of a biologically functioning unit for bull trout. The combination of core habitat (*i.e.*, habitat that could supply all the necessary elements for the long-term security of bull trout, including for both spawning and rearing, as well as for foraging, migrating, and overwintering) and a core population (*i.e.*, bull trout inhabiting a core habitat) constitutes the basic core area upon which to gauge recovery within a recovery unit.

Bull trout are widely distributed in the Clearwater River Recovery Unit. The Clearwater River recovery team identified local and potential local populations through application of a matrix exercise. The Clearwater River Recovery Unit consists of 7 core areas, with a total of 45 local populations and 27 potential local populations distributed among the core areas (Table 2) (Clearwater Recovery Unit Team, *in litt.* 2000; Clearwater Recovery Unit Team, *in litt.* 2002). The number of local populations includes those stream complexes for which the presence of bull trout spawning and rearing is known or determined through professional judgement as highly likely. As more fish distribution and abundance information is collected, the number of local populations identified will likely increase. The recovery team also identified potential local populations for some core areas. A potential local population is a known or suspected unoccupied area (due to habitat degradation or access barriers) that has the potential to provide spawning and rearing habitat for bull trout, and support a local population in the future as bull trout are recovered and after habitat or access has been restored.

Table 2. List of bull trout local populations and potential local populations, by core area, in the Clearwater River Recovery Unit.

Core Area	Local Population	Potential Local Population
North Fork Clearwater River	Kelly Creek	Cold Springs Creek*
	Cayuse Creek	Rock Creek*
	Moose Creek	Orogrande Creek

Core Area	Local Population	Potential Local Population
	Upper North Fork Clearwater (including Black Canyon)	Beaver Creek
	Fourth of July Creek	
	Weitas Creek	
	Quartz Creek	
	Skull Creek	
	Isabella Creek	
	Little North Fork Clearwater River	
	Floodwood Creek	
Fish Lake (North Fork Clearwater River)	Fish Lake	
Lochsa River	Fishing (Squaw) Creek	Post Office Creek*
	Legendary Bear (Papoose) Creek	Weir Creek*
	Fox Creek	Indian Grave Creek*
	Shotgun Creek	Lake Creek*
	Crooked Fork / Hopeful Creek	Boulder Creek*
	Boulder Creek	Old Man Creek*
	Haskell Creek	Hungery Creek*
	Rock Creek	Fish Creek*
	Brushy Fork Creek	Split Creek*
	Spruce Creek	Pete King Creek
	Twin Creek	Canyon Creek
	Colt Killed (White Sands) Creek	Deadman Creek
	Beaver Creek	Fire Creek
	Storm Creek	Coolwater Creek
Lochsa River (cont'd)	Walton Creek	
	Lower Warm Springs Creek	
Fish Lake (Lochsa River)	Fish Lake	

Core Area	Local Population	Potential Local Population
Selway River	Upper Selway River	Marten Creek*
	Magruder Creek	Mink Creek*
	Deep Creek	Gedney Creek*
	Little Clearwater River	O'Hara Creek*
	Indian Creek	Three Links Creek
	White Cap Creek	
	Running Creek	
	Bear Creek	
	Moose Creek	
	Meadow Creek	
South Fork Clearwater River	Red River	Mill Creek*
	Crooked River	American River*
	Newsome Creek	Meadow Creek
	Tenmile Creek	
	Johns Creek	
Lower and Middle Fork Clearwater River	Lolo Creek	Clear Creek*

* Denotes an Essential Potential Local Population (see Recovery Criteria #1).

Recovery Goals and Objectives

The goal of the bull trout recovery plan is to **ensure the long-term persistence of self-sustaining, complex, interacting groups of bull trout distributed across the species native range, so that the species can be delisted**. To accomplish the goal, recovery objectives addressing distribution, abundance, habitat and genetics were identified.

The recovery objectives for the Clearwater River Recovery Unit are as follows:

- Maintain the current distribution of bull trout and restore their distribution in previously occupied areas within the Clearwater River Recovery Unit.

- Maintain stable or increasing trends in abundance of bull trout in the Clearwater River Recovery Unit.
- Restore and maintain suitable habitat conditions for all bull trout life history stages and strategies.

- Conserve genetic diversity and provide opportunity for genetic exchange.

Rieman and McIntyre (1993) and Rieman and Allendorf (2001) evaluated the bull trout population numbers and habitat thresholds necessary for long-term viability of the species. They identified four elements, and the characteristics of those elements, to consider when evaluating the viability of bull trout populations. These four elements are (1) number of local populations; (2) adult abundance (defined as the number of spawning fish present in a core area in a given year); (3) productivity, or the reproductive rate of the population (as measured by population trend and variability); and (4) connectivity (as represented by the migratory life history form and functional habitat). For each element, the Clearwater River Recovery Unit Team classified bull trout into relative risk categories based on the best available data and the professional judgment of the team.

The Clearwater River Recovery Unit Team also evaluated each element under a potential recovered condition to produce recovery criteria. Evaluation of these elements under a recovered condition assumed that actions identified within this chapter had been implemented. Recovery criteria for the Clearwater River Recovery Unit reflect (1) the stated objectives for the recovery unit, (2) evaluation of each population element in both current and recovered conditions, and (3) consideration of current and recovered habitat characteristics within the recovery unit. Recovery criteria will probably be revised in the future as more detailed information on bull trout population dynamics becomes available. Given the limited information on bull trout, both the level of adult abundance and the number of local populations needed to lessen the risk of extinction should be viewed as a best estimate.

This approach to developing recovery criteria acknowledges that the status of populations in some core areas may remain short of ideals described by conservation biology theory. Some core areas may be limited by natural attributes or by patch size and may always remain at a relatively high risk of extinction. Because of limited data within the Clearwater River Recovery Unit, the recovery unit team relied heavily on the professional judgment of its members.

Local Populations. Metapopulation theory is important to consider in bull trout recovery. A metapopulation is an interacting network of local populations with varying frequencies of migration and gene flow among them (Meffe and Carroll 1994) (see Chapter 1). Multiple local populations distributed and interconnected throughout a watershed provide a mechanism for spreading risk from stochastic events. In part, distribution of local populations in such a manner is an indicator of a functioning core area. Based in part on guidance from Rieman and McIntyre (1993), bull trout core areas with fewer than 5 local populations are at increased risk, core areas with between 5 and 10 local populations are at intermediate risk, and core areas with more than 10 interconnected local populations are at diminished risk.

In the North Fork Clearwater River and Lochsa River core areas there are currently 11 and 16 known local populations, respectively. Based on the above guidance, bull trout in these core areas are at a diminished risk of adverse effects from stochastic events. Bull trout in the Selway River Core Area are at an intermediate risk because there currently are 10 known local populations. In the South Fork Clearwater River Core Area there are currently five known local populations; these bull trout are at an increased risk from stochastic events. There is one known local population in each of the Fish Lake (North Fork Clearwater River), Middle Fork/Lower Clearwater River, and Fish Lake (Lochsa River) core areas. Based on the above guidance, bull trout in these core areas are at an increased risk of adverse effects from stochastic events, and additional local populations are needed to reduce this risk.

Adult Abundance. The recovered abundance levels in the Clearwater River Recovery Unit were determined by considering theoretical estimates of effective population size, historical census information, and the professional

judgment of recovery team members. In general, effective population size is a theoretical concept that allows us to predict potential future losses of genetic variation within a population due to small population sizes and genetic drift (see Chapter 1). For the purpose of recovery planning, effective population size is the number of adult bull trout that successfully spawn annually. Based on standardized theoretical equations (Crow and Kimura 1970), guidelines have been established for maintaining minimum effective population sizes for conservation purposes. Effective population sizes of greater than 50 adults are necessary to prevent inbreeding depression and a potential decrease in viability or reproductive fitness of a population (Franklin 1980). To minimize the loss of genetic variation due to genetic drift and to maintain constant genetic variance within a population, an effective population size of at least 500 is recommended (Franklin 1980; Soule 1980; Lande 1988). Effective population sizes required to maintain long-term genetic variation that can serve as a reservoir for future adaptations in response to natural selection and changing environmental conditions are discussed in Chapter 1 of the recovery plan.

For bull trout, Rieman and Allendorf (2001) estimated that a minimum number of 50 to 100 spawners per year is needed to minimize potential inbreeding effects within local populations. In addition, a population size of between 500 and 1,000 adults in a core area is needed to minimize the deleterious effects of genetic variation from drift.

For the purposes of bull trout recovery planning, abundance levels were conservatively evaluated at the local population and core area levels. Local populations containing fewer than 100 spawning adults per year were classified as at risk from inbreeding depression. Bull trout core areas containing fewer than 1,000 spawning adults per year were classified as at risk from genetic drift.

Abundance estimates for the Clearwater River Recovery Unit are currently not available due to limited and nonrepresentative data. Similarly, detailed abundance estimates are not available at the local population scale. However, the recovery unit team was able to estimate abundance for some core areas. For the Fish Lake (Lochsa River) and the Middle Fork/Lower Clearwater River core areas, there are likely less than 500 adult-sized fish present. Based on the above

guidance, these core areas are at an increased risk of genetic drift. The recovery unit team estimated that there are likely at least 500 adult-sized fish present in the remaining core areas: North Fork Clearwater River, Fish Lake (North Fork Clearwater River), Lochsa River, Selway River, and South Fork Clearwater River. However, additional monitoring data is needed to thoroughly evaluate the risk that genetic drift poses to these core areas.

Productivity. A stable or increasing population is a key criterion for recovery under the requirements of the Endangered Species Act. Measures of the trend of a population (the tendency to increase, decrease, or remain stable) include population growth rate or productivity. Estimates of population growth rate (*i.e.*, productivity over the entire life cycle) that indicate a population is consistently failing to replace itself also indicate an increased risk of extinction. Therefore, the reproductive rate should indicate that the population is replacing itself, or growing.

Since estimates of the total population size are rarely available, the productivity or population growth rate is usually estimated from temporal trends in indices of abundance at a particular life stage. For example, redd counts are often used as an index of a spawning adult population. The direction and magnitude of a trend in the index can be used as a surrogate for the growth rate of the entire population. For instance, a downward trend in an abundance indicator may signal the need for increased protection, regardless of the actual size of the population. A population that is below recovered abundance levels, but that is moving toward recovery, would be expected to exhibit an increasing trend in the indicator.

The population growth rate is an indicator of probability of extinction. This probability cannot be measured directly, but it can be estimated as the consequence of the population growth rate and the variability in that rate. For a population to be considered viable, its natural productivity should be sufficient for the population to replace itself from generation to generation. Evaluations of population status will also have to take into account uncertainty in estimates of population growth rate or productivity. For a population to contribute to recovery, its growth rate must indicate that the population is stable or increasing for a period of time. Based on the lack of survey data in the North Fork Clearwater River, Lochsa River, Fish Lake (Lochsa River), Selway River, South Fork Clearwater

River, and Middle Fork/Lower Clearwater River core areas, bull trout in these areas are considered at an increased risk. In contrast, bull trout in the Fish Lake (North Fork Clearwater River) Core Area are at a diminished threat due to long-term creel data that indicates a stable population trend.

Connectivity. The presence of the migratory life history form within the Clearwater River Recovery Unit was used as an indicator of the functional connectivity of the recovery unit. If the migratory life form was absent, or if the migratory form is present but local populations lack connectivity, the core area was considered to be at increased risk. If the migratory life form persists in at least some local populations, with partial ability to connect with other local populations, the core area was judged to be at intermediate risk. Finally, if the migratory life form was present in all or nearly all local populations, and had the ability to connect with other local populations, the core area was considered to be at diminished risk.

Migratory bull trout likely persist in most local populations in the North Fork Clearwater River, Fish Lake (North Fork Clearwater River), Lochsa River, Fish Lake (Lochsa River), and Selway River core areas; these areas are therefore considered at a diminished risk. Migratory bull trout may persist in some local populations in the South Fork Clearwater River Core Area and thus are considered at an intermediate risk. Migratory bull trout in the Middle Fork/Lower Clearwater River Core Area are believed to be absent. Based on the above guidance, this core area is at increased risk. The low abundance of the migratory life history strategy limits the possibility for genetic exchange and local population re-establishment.

Recovery Criteria

Recovery criteria for bull trout in the Clearwater River Recovery Unit are the following:

1. **Maintain the current distribution of bull trout in the 45 currently identified local populations, restore or confirm distribution in the 18 potential local populations that are necessary for recovery, and**

determine the feasibility of establishing 8 additional potential local populations (Table 2 and Figures 3 through 9). The Clearwater recovery team identified several potential local populations where there is either documented bull trout presence but no documentation of spawning and rearing, or historical presence but no current (or insufficient) survey data to indicate bull trout presence or absence. These areas currently provide suitable habitat, or did historically and could again if restored. The Clearwater recovery unit team determined that 26 potential local populations are important for bull trout recovery within the recovery unit. Due to varying levels/degrees of threats/degradation and funding practicalities (MTBTSG 1998), the recovery unit team divided these 26 potential local populations to one of two groups in an effort to provide maximum recovery benefits to bull trout. Eighteen potential local populations were assigned a higher priority and determined to be essential to bull trout recovery because they will assist with attainment of the recovery objectives and criteria for distribution and abundance and will improve connectivity within and between core areas. These potential local populations include Rock, Cold Springs, Post Office, Weir, Hungery, Fish, Indian Grave, Lake, Boulder, Old Man, Split, Marten, Mink, Gedney, O'Hara, Clear, and Mill creeks, and American River. Most of these streams do not have adequate survey data and should be investigated to determine whether local populations are currently present. Eight potential local populations were assigned a lower priority because they currently either have degraded habitat or threats present such that support of bull trout may not be currently possible. The second priority potential local populations include Beaver, Orogrande, Deadman, Canyon, Coolwater, Fire, Pete King, Meadow, and Three Links creeks (Clearwater Recovery Unit Team, *in litt.* 2000; Clearwater Recovery Unit Team, *in litt.* 2002). Should limited funding be available, recovery actions should first be directed toward the higher priority 18 potential local populations.

2. **Achieve estimated abundance of adult bull trout of at least 21,500 individuals in the Clearwater River Recovery Unit including at least 500 individuals in each of the Fish Lake (North Fork Clearwater River), the Fish Lake (Lochsa River), and the Lower/Middle Fork**

Clearwater River core areas; and at least 5,000 individuals in each of the North Fork Clearwater River, the Lochsa River, the Selway River, and the South Fork Clearwater River core areas (Table 3). Abundance of adult bull trout for the recovery unit was estimated based on professional judgement using surveyed fish densities, consideration of current habitat conditions and potential conditions after threats have been addressed (Clearwater Recovery Unit Team, *in litt.* 2000).

3. **Restore adult bull trout local populations to exhibit stable or increasing trends in abundance in the Clearwater River Recovery Unit, based on at least 15 years of monitoring data.** The intent of this criterion is that adult bull trout in core areas presently below their recovered abundance exhibit increasing trends, whereas bull trout in core areas that may be at their recovered abundance exhibit stable trends. See Monitoring Strategy section of this chapter for further clarification.

4. **Address specific known barriers to bull trout migration in the Clearwater River Recovery Unit, and identify and address additional barriers. Known passage barriers that must be addressed include: culvert on Forest Service Road 222 (T26N, R8E, S3) in South Fork Red River; private road culvert at confluence of East Fork American River with American River; culvert on county road crossing in Big Elk Creek approximately 0.65 miles upstream from Little Elk Creek confluence; culvert on Forest Service Road 108 in the West Fork Fishing (Squaw) Creek; culverts on Highway 12 at Badger, Cold Storage, and Noseeum creeks; culvert on Forest Service Road 223 at the mouth of Boyd Creek. Other passage barriers that must be addressed are those that have been identified within a general location and need further investigation on the specific location, including: Little North Fork Clearwater River (two culverts between Butte and Culdesac creeks); Beaver Creek below Sheep Mountain sub-watershed (two culverts); North Fork Clearwater River above Isabella Creek sub-watershed (three culverts); Death/Fisher/Trail sub-watershed (two culverts); Cold Springs sub-watershed (one culvert), Long/Short/Slate sub-watershed (two culverts); Moose Creek sub-watershed (one**

culvert); Cayuse Creek watershed (culvert barrier in Mae Creek). Substantial gains in reconnecting fragmented habitat may be achieved in all core areas by restoring passage over or around many of the barriers that are typically located on smaller streams, including road crossings, culverts, and water diversions. The priority for elimination of passage barriers and re-establishment of connectivity by core area is; the South Fork Clearwater, Lochsa, North Fork Clearwater, Lower/Middle Fork Clearwater, and Selway River core areas. Within the core areas, priority should be placed on watersheds currently occupied by bull trout.

The known barriers are listed above and in the Recovery Measures Narrative (section 1.2) portion of this plan, but many have not yet been identified. However, they are collectively very important to recovery. Tasks to identify and assess barriers to bull trout passage are recommended in this recovery plan and appropriate actions must be implemented. A list of all such artificial barriers should be prepared in the first five years of implementation. Surveys to identify passage barriers should be prioritized by core area as follows: South Fork Clearwater, Lochsa, North Fork Clearwater, Lower/Middle Fork Clearwater, and Selway River core areas. Substantial progress must be made in providing passage over the majority of these sites, consistent with the protection of upstream populations of westslope cutthroat trout and other native fishes, to meet the bull trout recovery criteria for connectivity.

Recovery criteria for the Clearwater River Recovery Unit were established to assess whether recovery actions are resulting in the recovery of bull trout. The Clearwater River Recovery Unit Team expects that the recovery process will be dynamic and will be refined as more information becomes available. While removal of bull trout as a species under the Endangered Species Act (*i.e.*, delisting) can only occur for the entity that was listed (Columbia River distinct population segment), the criteria listed above will be used to determine when the Clearwater River Recovery Unit is fully contributing to recovery of the population segment.

Table 3. Summary of the recovery criteria for bull trout in the Clearwater River Recovery Unit.

Core Area in the Clearwater River Recovery Unit	Number of Local and Potential Local Populations[1]	Minimum Adult Abundance[1]	Trend in Abundance	Number of Known and Suspected Barriers Addressed
North Fork Clearwater River	11 local populations, 2 potential	5,000	stable to increasing	at least 14
Fish Lake (North Fork Clearwater River)	1 local population	500	stable to increasing	none
Lochsa River	16 local populations, 9 potential	5,000	stable to increasing	at least 4
Fish Lake (Lochsa River)	1 local population	500	stable to increasing	none
Selway River	10 local populations, 4 potential	5,000	stable to increasing	at least 2
South Fork Clearwater River	5 local populations, 2 potential	5000	stable to increasing	at least 3
Lower and Middle Fork Clearwater River	1 local population, 1 potential	500	stable to increasing	no currently known
Total Numbers	45 local populations, 18 potential	21,500	stable to increasing	at least 23

[1] Local population numbers and estimated adult abundance were derived from the Clearwater River bull trout recovery team meetings of June 12, 2000, and April 2002 (Clearwater Recovery Unit Team, *in litt.* 2000; Clearwater Recovery Unit Team, *in litt.* 2002).

Research Needs Related to Bull Trout Abundance, Distribution, and Actions Needed

Based on the best scientific information available, the Clearwater River Recovery Unit Team has identified recovery criteria, and actions necessary for recovery of bull trout within the recovery unit. However, the recovery unit team recognizes that uncertainties exist regarding bull trout population abundance, distribution, and actions needed to achieve recovery. The recovery team feels that if effective management and recovery are to occur, the recovery plan for the Clearwater River will be viewed as a "living" document, which will be updated as

new information becomes available. The recovery unit team will rely on adaptive management to guide recovery implementation. Adaptive management is a continuing process of planning, monitoring, evaluating management actions, and research. Adaptive management will involve a broad spectrum of user groups and will lay the framework for decision-making relative to recovery implementation and ultimately the possible revision of recovery criteria in this recovery unit. As a part of this adaptive management approach, the recovery unit team has identified research needs which are essential within the recovery unit.

A primary research need is a complete understanding of the current, and future, role that the mainstem Snake River should play in the recovery of bull trout. It is likely that a portion of the fluvial bull trout in the Clearwater River basin historically migrated into the mainstem Snake River to overwinter and feed, resulting in intermingling with other bull trout populations. The construction of two dams for power and irrigation in 1925 on the lower Clearwater River 5,027 and 6,764 meters (5,500 and 7,400 yards) above the mouth may have impacted connectivity of bull trout populations from the Clearwater River Recovery Unit with other recovery units. These dams reduced fish runs in the Clearwater River basin more than any other factor because the lower dam (built to provide power) was built without any provision for fish passage until 15 years after it was constructed. For example, chinook counts over the diversion dam declined from 335 in 1928, to 103 in 1929, to 7 in 1938. Legacy effects include reduced native anadromous fish populations, and may also include reduced levels or loss of connectivity of Clearwater bull trout local populations with other Columbia River basin bull trout local populations.

Uncertainty as to the current use of the mainstem Snake River by fluvial bull trout that also use the habitat in the recovery unit has led the recovery team to identify bull trout use of the Snake River as a research need. Given that bull trout have recently been found in the Snake River in the Hells Canyon Complex and downstream of the mouth of the Grand Ronde River, a better understanding of migration patterns between basins would greatly enhance the opportunities for recovery. The recovery team believes that migrational studies for the Clearwater River Recovery Unit should be coordinated with the Hells Canyon Complex, Grande Ronde, Imnaha, and Salmon River recovery units to provide a more complete understanding of adult bull trout habitat requirements.

The team has identified an urgent need for the development of a standardized monitoring and assessment program which would more accurately describe the current status of bull trout within the recovery unit, as well as identify improvements in sampling protocols and allow for monitoring the effectiveness of recovery actions. Development and application of models that assess extinction risk relative to abundance and distribution parameters are critical in refining recovery criteria as the recovery process proceeds. In addition, the development of a scientifically based approach for detecting bull trout presence is essential for recovery implementation.

This recovery unit chapter is the first step in the planning process for bull trout recovery in the Clearwater River Recovery Unit. Monitoring and evaluation of population levels and distribution will be an important component of any adaptive management approach. The Service will take the lead in developing a comprehensive monitoring approach which will provide guidance and consistency in evaluating bull trout populations. An important component in the application of adaptive management in recovery implementation will be the evaluation of the implementation of recommended actions and monitoring of their effectiveness.

The effects of Dworshak dam on bull trout populations in the Clearwater River Recovery Unit have been significant and should be researched. Dworshak dam does not permit any fish passage between the North Fork Clearwater and the rest of the Clearwater River basin, except downstream passage on occasion. Bull trout populations in the North Fork Clearwater have been isolated from the Lochsa, Selway and South Fork populations since the dam was constructed in 1971. It is unclear to what degree these populations interacted prior to construction of the dam. Because population isolation may affect long-term population survival at the bull trout individual, local population, and metapopulation levels, genetic and ecological studies are necessary to provide information to determine the effects of isolation due to Dworshak Dam (CBBTTAT 1998b). Genetic comparisons between these populations would help determine if there is a need to re-establish the connection between these subbasins. In addition, the releases of water from Dworshak Dam have large affects on water flows and temperatures in the Clearwater River below the dam. Altered water temperatures may affect the spawning locations of bull trout prey species such as fall chinook, resulting in redd placement that is lower in the Clearwater and Snake Rivers compared to historic placement. The effects of warmer

winter water temperatures and cooler summer water temperatures, resulting from the regulation of Dworshak Dam flows, on bull trout distribution and movements in the lower Clearwater River are unknown and should be investigated (CBBTTAT 1998c). Investigations should also determine whether summer drawdowns of Dworshak reservoir create a thermal barrier at the head of the reservoir, hindering bull trout migration and access to upstream tributaries in the North Fork core area.

ACTIONS NEEDED

Recovery Measures Narrative

In this chapter and all other chapters of the bull trout recovery plan, the recovery measures narrative consists of a hierarchical listing of actions that follows a standard template. The first-tier entries are identical in all chapters and represent general recovery tasks under which specific (*e.g.*, third-tier) tasks appear when appropriate. Second-tier entries also represent general recovery tasks under which specific tasks appear. Second-tier tasks that do not include specific third-tier actions are usually programmatic activities that are applicable across the species' range; they appear in *italic type*. These tasks may or may not have third-tier tasks associated with them; see Chapter 1 for more explanation. Some second-tier tasks may not be sufficiently developed to apply to the recovery unit at this time; they appear in *a shaded italic type (as seen here)*. These tasks are included to preserve consistency in numbering tasks among recovery unit chapters and intended to assist in generating information during the comment period for the draft recovery plan, a period when additional tasks may be developed. Third-tier entries are tasks specific to the Clearwater River Recovery Unit. They appear in the implementation schedule that follows this section and are identified by three numerals separated by periods.

The Clearwater River Recovery Unit chapter should be updated or revised as recovery tasks are accomplished, or revised as environmental conditions change, and monitoring results or additional information become available. Revisions to the Clearwater River Recovery Unit chapter will likely focus on priority streams or stream segments within core areas where restoration activities occurred, and habitat or bull trout populations have shown a positive response. The Clearwater River Recovery Unit team should meet annually to prioritize recovery activities, review annual monitoring reports and summaries, and make recommendations to the U.S. Fish and Wildlife Service.

1 Protect, restore, and maintain suitable habitat conditions for bull trout.

1.1 Maintain or improve water quality in bull trout core areas or potential core habitat.

1.1.1 Reduce fine sediment production. Identify and reduce fine sediment sources from agriculture and forest management practices in watersheds of the Clearwater River Recovery Unit. Stabilize roads, road stream crossings, landslides and other known sources of sediment delivery. Implement recommendations from the U.S. Forest Service and Bureau of Land Management Watershed Analyses and other plans that are geared to remediation of sediment production. Implement Best Management Practices in timber sale planning to minimize sediment production associated with logging activities. Monitor the effectiveness of sediment reduction projects.

Priority watersheds include those with known or potential bull trout populations. In the North Fork Clearwater and Lochsa River basins, several watersheds have been intensively managed for timber production and are subject to elevated sedimentation from the activities and resulting landslides (*e.g.* Quartz, Cold Springs, Deception, Breakfast, and Fishing (Squaw) Creek watersheds). Roads constructed for logging and mining are a constant source of sediment in the Fishing (Squaw), Legendary Bear (Papoose), Shotgun, Spruce, Beaver, and lower Boulder Creek watersheds; Red River; American and Crooked Rivers; and Newsome Creek. Roads and agricultural practices are sediment sources for Lolo and Clear creeks. Highway 12 is a source of gravel and fine sediments to the Lochsa River, Crooked Fork Creek, Middle Fork Clearwater River, and the Lower Clearwater River. In the Middle-Lower Clearwater basin, agricultural practices have contributed excessive sediment to the Potlatch River.

Additional priority sediment sources may be identified in the watershed analyses conducted in Task 1.3.1.

1.1.2 Address forest road maintenance and areas with high sediment loading. Identify maintenance needs, exacerbated sediment production areas, and surplus forest roads. Improve roads that negatively impact water quality by removal, access restrictions, making alternative routes, and/or upgrading roads and applying all maintenance procedures. Emphasize maintenance of extensive U.S. Forest Service and State lands secondary road systems by increased application of Best Management Practices, with a focus on remediation of sediment producing hotspots, and maintenance of bridges, culverts, and crossings in drainages supporting bull trout spawning and rearing. Decommission/remove surplus forest roads: especially those that are chronic sources of fine sediment and/or those located in areas of highly erodible geological formations. Remove culverts and/or bridges on closed roads that are no longer maintained. Idaho Department of Lands and U.S. Forest Service have made significant efforts in this arena, but areas that continue to require particular attention include those listed in Task 1.1.1, and any others that are identified in the watershed analyses conducted in Task 1.3.1. Monitor the effectiveness of forest road maintenance and sediment reduction projects.

1.1.3 Identify areas of excess fine sediment delivery due to trail use and implement actions to reduce or eliminate fine sediment delivery. Although sediment production from trails is usually less than that from roads and landslides, the following areas are currently known to receive heavy recreational use, and should be prioritized for surveys and management action. Mainline trails used by livestock packers, off-road motorists, and backpackers follow Kelly Creek, Cayuse Creek, Weitas Creek,

and the Little North Fork Clearwater River. Fish Lake (North Fork Clearwater) is accessed by a well developed off-highway vehicle (OHV) trail and is one of the only high elevation lakes where OHV access is permitted. Riparian areas along the outlet creek and around the lake may be impacted by OHV use. Impacts to the Fish Lake (Lochsa) inlet stream from stream-side campsites and a ford at Wounded Doe trailhead should be addressed by efforts to repair cut banks, restore overused campsites, construct trail bridges at stream crossings, and restrict livestock access to the stream. Monitor the effectiveness of the above sediment reduction projects.

1.1.4 Improve maintenance along transportation corridors. The maintenance of all major roads along riparian corridors should be improved to reduce impacts of fine sediment and floodplain encroachment. Whenever possible, relocate problem (high sediment-producing) road reaches out of riparian corridors. Locate all dump areas for excess road material in stable upland areas away from stream/riverbeds. Priority areas include the Highway 12 corridor along Crooked Fork Creek and the Lochsa River; the Middle Fork and lower (mainstem) Clearwater Rivers and their major tributaries; the Highway 14 corridor along the South Fork Clearwater River; U.S. Forest Service Road 233 along Crooked River; the Camas Prairie railroad along the mainstem Clearwater River; U.S. Forest Service Roads 247 and 250 from the upper part of Dworshak reservoir to the Cedars campground near the mouths of Long and Lake creeks, and Road 250 from Long Creek to Hoodoo pass on the Montana border.

1.1.5 Decrease the potential of, and improve quick response capability for, dealing with potential hazardous material spills. Coordinate with Idaho Department of Transportation, Idaho Department of Environmental Quality, Idaho Department of

Fish and Game, and National Marine Fisheries Service to investigate what hazardous materials are being transported on Highway 12 (high priority) and Highway 14. Evaluate the need to form a task force (including the above agencies and others) to investigate ways to decrease the potential of a hazardous materials spill and to rapidly respond to such an event.

1.1.6 Restore areas degraded by historical timber harvest. Legacy impacts from timber harvest include lack of riparian trees and vegetation, high road densities, large areas of clearcuts, altered hydrologic regimes including increased peak flows, and other impacts that have created excessive fine sediment sources for watersheds. Potential restoration treatments include channel stabilization, riparian and upland plantings, placement of instream woody debris, etc. The following drainages have been degraded by historic timber harvest and have embedded and de-stabilized streams: Quartz, Cold Springs, Skull, Deception, Beaver, Isabella, and Moose creeks; Fishing (Squaw), Legendary Bear (Papoose), Shotgun, Spruce, Beaver, and lower Boulder creeks; Red River, American and Crooked Rivers, and Newsome Creek; and Lolo and Clear creeks. Streams in the upper Little North Fork Clearwater River include Adair, Jungle, Rutledge, and Montana creeks, where historic management has removed streamside vegetation and increased fine sediment delivery.

1.1.7 Identify problem mine sites and remediate tailings, ponds, and other associated waste. Monitor and control mining runoff from roads, dumps, and ponds, and remove and stabilize mine tailings and waste rock deposited in the stream channel and floodplains and restore stream channel function. The South Fork Clearwater River core area has the greatest scope and magnitude of impacts from mining activities, and the North

Fork Clearwater River is second. Top priority watersheds within the South Fork core area include Newsome Creek and Crooked River, followed by Red, American and mainstem South Fork Clearwater Rivers. In the North Fork core area, Moose (Moose and Independence Creek drainages especially) and Chamberlain Creek watersheds are a high priority; followed by Vanderbilt, Niagra and Meadow Creek watersheds and the upper North Fork Clearwater River. Monitor erosion control measures at aggregate pits in the North Fork, South Fork, and Middle Fork/Lower Clearwater River core areas and make improvements as necessary.

1.1.8 Assess and mitigate point and nonpoint thermal pollution. Assess and attempt to remove affects to bull trout from thermal pollution that negatively impacts receiving waters and migratory corridors downstream. Priority watersheds include those listed (for thermal pollution) in Appendix A 3: South Fork Clearwater River mainstem and tributaries; Osier Creek and tributaries to Dworshak Reservoir; Lochsa River mainstem and tributaries; major tributaries to the mainstem Clearwater River and their tributaries; as well as Potlatch River, Lapwai Creek, Lolo Creek, and Big Canyon Creek.

1.1.9 Reduce nutrient input. Assess and continue to address effects of nutrient enrichment from practices associated with forest management in the North Fork and South Fork Clearwater, and Lochsa River core areas. Reduce nutrient delivery throughout the developed portions of the Lower/Middle Fork and South Fork core areas by improving sewage disposal, agricultural practices, and ranching practices.

1.1.10 Eliminate or reduce the number and length of stream segments with impaired water quality. Eliminate or modify factors responsible for stream reaches listed as “water quality limited

segments" under section 303(d) of the Clean Water Act. See Appendix A for a complete list of streams by core area. Most streams appearing on the 303(d) list do not meet beneficial uses for sediment, some are listed due to temperature, and some are listed for numerous pollutants including sediment, temperature, nutrients, biochemical contamination, and habitat alteration. Prioritize streams within identified bull trout local populations and essential potential local populations (Table 2 and recovery criteria 1) and streams identified as providing foraging, migrating, and overwintering habitat. Priority 303(d) list streams by core area include: South Fork Clearwater River core area (Dawson, Buffalo Gulch, Big Elk, Little Elk, Beaver, Nuggett, Sing Lee, and Newsome creeks, and mainstem South Fork Clearwater River); Lochsa River core area (Storm, Fish, and Deadman creeks, and mainstem Lochsa River); North Fork Clearwater River core area (China, Laundry, Osier, Sugar, Swamp, Deception, Gravey, Marten, Cold Springs, Cool, Cougar, Grizzly, Middle, Beaver, Bertha, Bingo, Sourdough, South Fork Beaver, Isabella, Dog, and Floodwood creeks, and mainstem North Fork Clearwater River below Dworshak Dam); and Middle Fork/Lower Clearwater River core area (Clear, Lolo, Jim Brown, Texas, Schmidt, Yakus, and Mud creeks, and
mainstem Clearwater River). There are no streams in the Selway River core area on the 303(d) list. Priority for rehabilitation of the remaining 303(d) streams should be by proximity to the streams listed above.

1.2 Identify barriers or sites of entrainment for bull trout and implement tasks to provide passage and eliminate entrainment.

1.2.1 <u>Identify culverts and other man-made barriers inhibiting fish passage</u>. Identify fish passage barriers in all watersheds where bull trout currently exist and in watersheds that bull trout could

potentially occupy. Analyze existing culvert survey data collected by the U.S. Forest Service, Bureau of Land Management, State and private landowners to identify culverts and other barriers inhibiting fish passage Where no survey data exists, surveys should be conducted by Federal and State land managers to identify culverts and barriers inhibiting fish passage. Each land manager should prepare an annual report of identified fish passage barriers, including a plan to address passage barriers, and progress toward addressing barriers and other accomplishments. Priority should be placed on watersheds currently occupied by bull trout.

Passage barriers that have been identified within a general location and need further investigation on the specific location include: **North Fork core area** - Little North Fork Clearwater River (two culverts between Butte and Culdesac creeks); Beaver Creek below Sheep Mountain sub-watershed (two culverts); North Fork Clearwater River above Isabella Creek sub-watershed (three culverts); Death/ Fisher/Trail sub-watershed (two culverts); Cold Springs sub-watershed (one culvert); Long/Short/Slate sub-watershed (two culverts); Moose Creek sub-watershed (one culvert); Cayuse Creek watershed (culvert barrier in Mae Creek, a tributary to Gravey Creek).

1.2.2 Eliminate known culvert and other man-made passage barriers (including those identified by task 1.2.1). Utilize data gathered from task 1.2.1 and where beneficial to native fish, replace, modify, or remove existing culverts, bridges, or other man-made barriers that impede passage. Consider native fish genetic concerns and the potential for invasion by nonnatives in all such evaluations. New culverts should be constructed/installed to avoid inhibiting passage of all life history phases of fish. New appropriately designed culverts or

bridges are recommended at stream crossings in habitat used by all life stages of bull trout. Monitor all projects after completion to determine if fish passage is restored. The highest priority for eliminating passage barriers and re-establishing connectivity is the South Fork River core area, followed in priority order by the Lochsa, North Fork Clearwater, Lower/Middle Fork Clearwater, and Selway River core areas.

Known passage barriers that need to be addressed include: **South Fork Clearwater River core area** - Modify the culvert (or replace with a bridge) on U.S. Forest Service Road 222 (T26N, R8E, S3) in South Fork Red River to allow upstream passage of age one and older bull trout. Replace the private road culvert at confluence of East Fork American River with American River to allow upstream passage of age one and older bull trout. Modify or replace the culvert on the county road crossing in Big Elk Creek approximately 0.65 miles upstream from Little Elk Creek confluence. **Lochsa River core area** - Modify or replace the culvert on U.S. Forest Service Road 108 to allow bull trout passage to the West Fork Fishing (Squaw) Creek. Modify or replace impassable culverts of Highway 12 to allow bull trout passage into Badger, Cold Storage, and Noseeum creeks. **Selway River core area** - Modify or replace the culvert on U.S. Forest Service Road 223 at the mouth of Boyd Creek to allow bull trout access to unoccupied habitat.

1.2.3 Consider providing passage around natural barriers. Evaluate removal of natural "semi-permanent" fish passage barriers (such as debris dams) and implement if necessary. The removal of the barriers should be evaluated to determine their effects and potential to increase habitat accessibility for bull trout. Evaluate and make recommendations concerning

potential benefits of fish passage around, or establishment of resident bull trout populations upstream from, natural barriers as a means of conserving genetic diversity in existing bull trout populations. Several known barriers exist, and others would need to be identified through stream surveys. Known natural barriers exist in: upper Brushy Fork, Pack, Warm Springs, Shotgun, and Big Sand, Crab, Old Man, and Deadman creeks in the Lochsa River core area; South Fork Kelly, Orogrande, and Foehl creeks in the North Fork Clearwater core area; and Twenty-mile Creek in the South Fork Clearwater core area.

1.3 Identify impaired stream channel and riparian areas and implement tasks to restore their appropriate functions.

1.3.1 Conduct watershed assessments in the North Fork, South Fork, and Middle/Lower Clearwater River, and Lochsa Core Areas. Watershed analysis is an assessment procedure used to understand the condition, trend, and interactions in a watershed. Key components of an analysis include evaluations of the transportation system, upland and riparian vegetation, social and human uses, and the aquatic habitat and species status. These assessments provide understanding of the management opportunities and needs within an area, and should facilitate project identification and prioritization for planning. Assessments include management recommendations on road maintenance needs and road removal, fish passage barrier removals, riparian vegetation management, and woody debris placement or removal. Such assessments have not been done for the majority of the key bull trout watersheds in the recovery unit. Watershed analysis should be a high priority for Red, American, and Crooked Rivers and Newsome Creek (in progress, to be completed in 2002) (South Fork Clearwater River core area); Crooked Fork and tributaries, Brushy Fork and tributaries, Colt Killed Creek and tributaries, Walton and Warm Springs creeks, Lochsa River (Loshsa River core area);

Middle Fork Clearwater River, Clear and Lolo creeks (Middle/Lower Clearwater River core area); North and South Forks Kelly Creek, Gravey, Long, Slate, Short, Lake, Goose, Weitas, Beaver, Isabella, and Floodwood creeks (North Fork Clearwater River core area). Other priority areas include known or suspected spawning and rearing streams, foraging and migratory habitat, and potential spawning, rearing and foraging habitat throughout the recovery unit.

1.3.2 Revegetate denuded riparian areas. Develop site specific plans to promote revegetation of riparian areas to ensure sufficient shade and canopy, large woody debris recruitment, riparian cover, and native vegetation are present to support native salmonids. Highest priority is on streams with existing bull trout populations. Revegetate riparian areas affected by logging in: Kelly Creek drainage, particularly in the Moose Creek and Cayuse Creek watersheds (North Fork Clearwater River core area); lower Red River, Crooked River along U.S. Forest Service Road #233, mainstem of upper South Fork Clearwater River (South Fork Clearwater River core area); and other watersheds as identified in watershed assessments (Task 1.3.1). Restore riparian vegetation removed by fire and timber salvage along the lower 3.2 kilometers (2 miles) of West Fork Floodwood Creek. Restore riparian vegetation removed by fires in: Hidden, Isabella, Skull, Quartz creeks (North Fork Clearwater River core area); and Haskell and Crooked Fork creeks (Lochsa River core area).

1.3.3 Restore stream reaches degraded by dredge and placer mining. Restore habitat, as feasible, in stream reaches that have been channelized and affected by mine tailing piles in the Moose Creek watershed of the North Fork Clearwater River core area. Mining activities in the South Fork Clearwater core area have been extensive in the Crooked and American River, and Newsome Creek watersheds, and to a lesser degree in the Red

River watershed. Restoration of mainstem reaches is critical to improving connectivity for fluvial fish between local populations in this core area. Restoration of lower and middle Crooked River, and Newsome Creek is a high priority.

1.3.4 Improve instream habitat. Conduct stream restoration in areas impacted by legacy and ongoing road effects, logging, agriculture, grazing, and urban development, stream cleaning, and mining. Increase or improve instream habitat by restoring recruitment of large woody debris, pools, or other appropriate habitat, wherever the need is identified. Priority watersheds include the upper North Fork Clearwater River, including Meadow, Caledonia, Vanderbilt, and Niagara creeks (North Fork Clearwater River core area); the upper Lochsa River drainage, including North Fork Spruce, Shoot, Twin, Legendary Bear (Papoose), and Fishing (Squaw) creeks (Lochsa River core area); upper South Fork Clearwater mainstem, American, Red and Crooked Rivers and Newsome Creek (South Fork Clearwater River core area); and Lolo and Clear creeks (Middle/Lower Clearwater River core area). Improve instream habitat for other priority areas identified by watershed assessments (Task 1.3.1).

1.3.5 Evaluate and implement actions to restore areas of Fish Lake Creek (Lochsa River) degraded by channelization and excessive bank erosion associated with the Fish Lake airstrip and campsites. Restore over-used campsites, reduce erosion on exposed banks, restrict pack animals from the stream, and construct trail bridges at two popular crossings (one at the trailhead). Evaluate the potential of restoring a natural meander pattern in the channelized reach of the inlet stream, either on the airstrip (where it was originally), or in the meadow complex to the southeast of the airstrip.

1.3.6 Evaluate and implement actions to restore degraded riparian habitat at Fish Lake (North Fork core area). Fish Lake (North Fork Clearwater) is accessed by a well developed off-highway vehicle (OHV) trail and is one of the only high elevation lakes where access is permitted. Riparian areas along the outlet creek and around the lake may be impacted by OHV use.

1.3.7 Identify and restore riparian areas where livestock grazing is impacting bull trout habitat. Identify problem areas cooperatively with U.S. Fish and Wildlife Service, Natural Resource Conservation Service, and land management agency personnel and private landowners. Revise grazing management plans to include performance standards that maintain stream channel condition that maintains high quality bull trout habitat and continue to enforce those already in place. Fence riparian areas to eliminate riparian degradation from grazing in problem areas. Monitor fencing effectiveness along riparian areas on Lolo Creek and its tributaries from Cottonwood Flats to the U.S. Forest Service boundary. Other priority areas include private land in lower Elk Creek (American River tributary); private land in lower and middle portions of the Red River; and private land in Clear Creek.

1.3.8 Identify riparian areas threatened by nonnative plant invasion, and evaluate and implement actions to restore native vegetation. Nonnative plant species compete with native riparian vegetation and affect aquatic habitat by altering natural ecological processes, with potential instream impacts of increased sedimentation and water temperatures, and decreased cover and woody debris. Bull trout spawning and rearing habitats have higher priority, particularly in such areas as the Lochsa, South Fork, and North Fork Clearwater, and Potlatch Rivers, and major tributaries paralleled by roads. Evaluate potential methods to control nonnative plant invasion and implement where necessary.

1.3.9 Improve stream channels near transportation corridors. Improve stream conditions where current and legacy highway and railroad encroachment, channel straightening, channel relocation, and undersized bridges exist. Coordinate with highway departments to minimize impacts of planned or existing highways on bull trout habitat. Initial areas to focus efforts include: the Lochsa River Highway 12 corridor, South Fork Clearwater Highway 14 corridor, Middle Fork/Lower Clearwater River railroad, and Highway 12 corridors. Highway 12 has reduced large wood recruitment and access to off-channel habitat in the Lochsa River, Crooked Fork Creek, and Middle Fork Clearwater River.

1.3.10 Identify areas in which secondary roads have been constructed in the floodplain and implement restoration actions. These roads have displaced riparian vegetation and are a constant source of fine sediment to the streams. Appropriate remedial measures should be developed and implemented. Priority areas include those in occupied bull trout habitat: Fishing (Squaw) and Legendary Bear (Papoose), North Fork Spruce and Shoot creeks (Lochsa River core area); Red River, Crooked and American Rivers, and Newsome Creek (South Fork Clearwater River core area); and Kelly, Cayuse, and upper North Fork Clearwater River (North Fork Clearwater core area). Include other priority areas identified by watershed assessments (Task 1.3.1).

1.3.11 Reduce campsite impacts. Identify areas of impact and develop methods to reduce impacts of concentrated and dispersed campsites in riparian areas. Priority areas include occupied bull trout habitat. Examples are mining camps in the Moose Creek drainage (North Fork Clearwater core area); and campsites along the upper North Fork and South Fork Clearwater, Lochsa, and lower Selway Rivers, and Newsome Creek.

1.3.12 Minimize potential stream channel degradation from flood control and response actions. Identify negative effects to bull trout from ongoing flood control activities (*e.g.*, dredging, channel clearing, bank stabilization, bank barbs and other structures or actions) and address where possible. Minimize future negative effects to bull trout habitat from flood control activities by coordinating with responsible agencies in development of flood control and response plans. Initial areas to focus include the South Fork and Middle/Lower Clearwater River core areas.

1.3.13 Evaluate overwintering habitat in the mainstem rivers. Identify specific overwintering areas utilized by bull trout in the mainstem rivers in the recovery unit and classify general overwintering habitat. Survey the habitat conditions in overwintering habitat areas to determine if it is degraded and could be restored. Determine if unoccupied overwintering habitat areas are degraded by sediment accumulation or through bedload movement, and would have potential to be utilized, if restored. Agricultural practices have caused heavy soil erosion, and altered the timing, peak, and magnitude of flows; resulting in high bedload, channel aggradation, and embeddedness in these mainstem rivers and their larger tributaries.

1.3.14 Implement restoration of overwintering habitat in the mainstem rivers, if needed. Implement necessary restoration activities to improve overwintering habitat, as identified by Task 1.3.13. Priority areas include the Middle Fork/Lower and South Fork Clearwater Rivers.

1.4 Operate dams to minimize negative effects on bull trout in reservoirs and downstream.

1.4.1 Evaluate direct losses of bull trout through Dworshak Dam. Drawdowns of Dworshak Reservoir can entrain bull trout and carry them into the mainstem Clearwater. In addition to causing a direct loss of individuals (and their genetic material) from local populations in the North Fork Clearwater River core area, these fish probably have low survival after entrainment. The loss of individuals from the upriver core area should be quantified and then evaluated in terms of its significance to long-term sustainability of the affected local populations.

1.4.2 Operate Dworshak Dam to reduce losses of kokanee salmon. Substantial numbers of kokanee, which have been introduced into Dworshak Reservoir and are a forage fish for bull trout, can be entrained below the dam during spills. Methods to reduce kokanee losses should be evaluated and implemented.

1.4.3 Evaluate the impact of summer drawdowns of Dworshak reservoir on upstream migration of bull trout. Summer drawdowns may create a thermal barrier at the head of the reservoir that may hinder bull trout migration and access to upstream tributaries in the North Fork core area. If upstream migration is hindered, evaluate options of limiting drawdowns or trapping and transporting bull trout above the thermal barrier.

1.5 Identify upland conditions negatively affecting bull trout habitat and implement tasks to restore appropriate functions.

1.5.1 Monitor and mitigate fire effects, where necessary. Monitor effects from wildfires and pursue habitat restoration actions where warranted. Adhere to programmatic fire suppression Biological Assessments and concurrence letters issued by the U.S. Forest Service and Bureau of Land Management. Prioritize upland and stream restoration where recent fires have occurred and impacted bull trout habitat, including: Haskell

and Crooked Fork creeks (Lochsa River core area), and Hidden, Quartz, Skull, upper Isabella, and West Fork Floodwood creeks (North Fork Clearwater River core area).

1.5.2 Compensate for legacy timber harvest and associated roading practices. Continue to mitigate for the legacy of intensive timber harvest and poor silvicultural and road construction practices in steep and highly erosive canyon breaklands. Past clearcutting practices and high density jammer-type road systems have resulted in mass wasting events and continued erosion and sediment introduction into bull trout habitat. Practices such as replanting, obliterating roads, and improving maintenance of roads should be continued and new techniques implemented. Priority areas include the upper Lochsa River checkerboard ownership areas (Lochsa River core area); Lake, Moose, Osier, Quartz, Skull, Orogrande, Sheep Mountain, Beaver Block, Floodwood, and Breakfast Creek drainages (North Fork Clearwater River core area); Red River, Newsome Creek, and American River (South Fork Clearwater River core area); Clear and Lolo creeks (Middle/Lower Clearwater River core area).

2 Prevent and reduce negative effects of nonnative fishes and other nonnative taxa on bull trout.

2.1 *Develop, implement, and enforce public and private fish stocking policies to reduce stocking of nonnative fishes that affect bull trout.*

2.2 *Enforce policies for preventing illegal transport and introduction of nonnative fishes.*

2.3 Provide information to the public about ecosystem concerns of illegal introductions of nonnative fishes.

2.3.1 Discourage unauthorized fish introductions. Focus an intensive public outreach campaign on the Clearwater basin to reduce the potential spread of illegally introduced nonnative fish species.

2.3.2 Develop a bull trout education program. Develop a public information program with an emphasis on bull trout ecology and life history requirements and more specific focus on regionally or locally important recovery issues. Coordinate with Idaho Department of Fish and Game and the U.S. Forest Service to utilize existing programs and develop an interagency program, if possible.

2.4 Evaluate biological, economic, and social effects of control of nonnative fishes.

2.4.1 Identify overlap in bull trout and nonnative fish (brook trout) distribution in all core areas. Utilize existing stream and fish survey data, and conduct surveys in unsurveyed areas. Prioritize local population areas where spawning and rearing has been documented, followed by potential local population areas. Evaluate potential effects of control of each overlapping brook trout population.

2.4.2 Develop protocols for suppressing nonnative fish and monitor impacts of ongoing actions. Continue to conduct research and develop protocols to describe the most effective methods for suppressing or eradicating brook trout populations from waters where they currently, or may in the future, negatively impact bull trout recovery in the Clearwater River system. Monitor the impact of the bonus brook trout limit in the Clearwater River Recovery Unit on reducing populations and limiting expansion of brook trout.

2.5 Implement control of nonnative fishes where found to be feasible and appropriate.

2.5.1 Reduce brook trout competition with bull trout where they are known to coexist, and where brook trout numbers are relatively low. Evaluate opportunities for selectively removing brook trout (*e.g.*, through liberalized angling and electrofishing) in areas where brook trout densities are relatively low and not expanding, and where there is a potential problem of competition with bull trout. Priorities include upper Crooked River (South Fork Clearwater River core area); Adair and Jungle creeks in the upper Little North Fork Clearwater River (North Fork Clearwater River core area); and Colt Killed Creek and its tributaries (Lochsa River core area).

2.5.2 Experimentally remove established brook trout populations from priority streams. Evaluate the feasibility of removing brook trout and develop an appropriate program. Where brook trout appear to be expanding in distribution in areas that offer suitable habitat for bull trout, eradication may be needed. Upper Crooked River and Fish Lake Creek (Lochsa core area) are areas where the threat from brook trout hybridization and competition can be reduced or forestalled by active removal of brook trout from the lakes and/or streams. Evaluate the potential of removal of established brook trout populations in: Meadow Creek drainage and associated high mountain lakes in the North Fork Clearwater core area, Elizabeth, Isabella, Larson, and Beaver creeks (North Fork Clearwater core area); Bimerick, Deadman, Stanley, Boulder, and Old Man creeks (Lochsa River core area); Yoosa and Musselshell Creek drainages of Lolo Creek, and Kay Creek (tributary of Clear Creek) (Middle/Lower Clearwater core area).

2.5.3 Monitor brook trout expansion and prevent brook trout from entering areas that overlap with occupied and unoccupied bull trout habitat, wherever possible. Monitor fish species distribution and trends in areas where the two species do not currently coexist and where the threat from brook trout appears

to be small, to increase understanding of the threat these brook trout represent. Known areas include Newsome Creek, and upper Crooked River where low numbers of brook trout have been found in the lower ends of the mainstems. Other areas include Orogrande Creek in the North Fork Clearwater core area; and dependent upon wilderness use/management constraints, Three Links, Gedney, Rhoda, Meadow, Mink, Buck Lake, Pettibone, and Running creeks in the Selway-Bitterroot Wilderness.

2.5.4 Evaluate extent of hybridization between bull and brook trout in areas where brook trout are firmly established and eradication is not possible. In areas where brook trout are firmly established and there is little opportunity to reduce the threat to bull trout, the priority should be genetic evaluation of the extent of hybridization that has occurred, along with continued trend analysis of the distribution and populations of both species. Priority areas are Red and American Rivers (South Fork Clearwater River core area); and East Moose Creek in the Selway core area.

2.6 *Develop tasks to reduce negative effects of nonnative taxa on bull trout.*

3 Establish fisheries management goals and objectives compatible with bull trout recovery, and implement practices to achieve goals.

3.1 Develop and implement State and tribal native fish management plans integrating adaptive research.

3.1.1 Develop a comprehensive fishery management plan for the Clearwater River Recovery Unit incorporating bull trout recovery and utilizing adaptive management. Develop and implement native fish management plans that emphasize integration of research into management programs. Integrate

bull trout recovery objectives and management plans for anadromous fish recovery; as management actions that support recovery of steelhead and salmon species will be beneficial for bull trout by improving prey base and habitat for coldwater salmonids.

3.2 Evaluate and prevent harvest and incidental angling mortality of bull trout.

3.2.1 Evaluate the amount and relative threat of illegal bull trout harvest and incidental fishing mortality. Information on the current threat of illegal harvest and fishing mortality on bull trout is very limited. An evaluation of these threats should be completed to determine their significance to bull trout recovery and potential management opportunities to minimize their impacts. The level of threat should be evaluated within an overall Clearwater River Recovery Unit context, and also evaluated with respect to other mortality threats for each local population (or logical combinations of local populations). Seasonal road closures should be implemented where roads readily access bull trout spawning areas, and illegal bull trout harvest is determined to be significant. Focus areas should include: Fish Lakes (North Fork and Lochsa core areas); Selway River below Meadow Creek and near Moose and Shearer airstrips; Red and Crooked Rivers; North Fork Clearwater River below Dworshak Dam; upper North Fork Clearwater River in Black Canyon and above Long Creek; and Crooked Fork and Colt Killed creeks and upper Lochsa River. This evaluation should consider the need for additional public awareness and outreach, which should be implemented wherever access to public lands is restricted.

3.2.2 Continue public outreach about fishing regulations, bull trout identification, and proper handling/release techniques. Maintain signs that are currently posted on Federal and State

land throughout the recovery unit. Display posters (the "Bull Trout Alert" poster) annually, especially at angling access areas and backcountry portals such as trailheads. Sign boards and posters should be displayed at backcountry airstrips at Fish Lake (Lochsa River core area); Moose Creek and Shearer (Selway River core area). Produce educational materials (pamphlets, wallet cards, etc.) for anglers addressing bull trout identification, proper handling and release techniques to reduce hooking mortality, regulations, and reasons for protective regulations. Distribute materials using U.S. Forest Service, Idaho Department of Fish and Game, and Bureau of Land Management personnel and offices; local businesses; and tourism centers.

3.2.4 Decrease incidental mortality of bull trout due to angling. Conduct additional patrols in sensitive areas at critical times. Consider regulation changes such as tributary closures to protect bull trout. Patrols should focus on identified staging (June to August), spawning (September to October), and wintering (November to March) areas for bull trout. Staging areas include larger mainstem streams below headwater tributaries, such as Black Canyon of the North Fork Clearwater River. Wintering areas include large mainstem rivers at lower elevations, such as the Middle Fork and lower Clearwater Rivers. For example, incidental mortality of wintering fluvial bull trout may be occurring during the winter and spring steelhead/salmon seasons in the Clearwater River.

3.2.5 Increase enforcement activities relating to the no bull trout harvest regulations. Specifically target known or identified (Task 3.2.1) problem areas where unauthorized harvest of bull trout is occurring. Increase backcountry enforcement patrols in the Selway-Bitterroot Wilderness around human concentration areas and near spawning and rearing areas. Increase enforcement patrols at the two Fish Lakes. Increase

enforcement along mainstem rivers paralleled by roads, especially in areas with late winter and spring steelhead and salmon fishing seasons. Also target known problem areas on the lower Selway, upper North Fork Clearwater, and upper Lochsa Rivers.

3.2.6 Inform the public about bull trout issues and general fisheries biology and management issues. Develop an outreach program to inform the general public, and key contacts such as anglers and outfitters/guides, about bull trout issues and general fisheries biology and management issues. Evaluate the potential of combining bull trout outreach with other fish conservation efforts. Begin efforts through the news media and other means to inform the public, emphasis should be on bull trout and bull trout recovery efforts being made by various agencies and other entities. Develop a school program and present information at local area schools.

3.3 Evaluate potential effects of introduced fishes and associated sport fisheries on bull trout recovery and implement tasks to minimize negative effects on bull trout.

3.3.1 Evaluate the potential for release of excess hatchery stock of anadromous fish into occupied bull trout habitat. Evaluate the positive and potential negative impacts of anadromous fish stocking programs currently operating in the Clearwater River Recovery Unit. The Lochsa, Selway and Middle Fork of the Clearwater Rivers historically sustained much larger populations of anadromous fish, which supported larger populations of bull trout. Release of excess hatchery stock in areas where bull trout and anadromous fish historically coexisted, and where anadromous populations are currently depressed, may aid bull trout recovery. Such streams include Crooked Fork and Colt Killed creeks, and the Lochsa, Selway, and South Fork Clearwater Rivers. Review annual fish

stocking programs to assure those programs for anadromous fish are not contributing fish diseases, exotic invertebrates or other problems such as increased competition, that could interfere with bull trout recovery.

3.4 Evaluate effects of existing and proposed sport fishing regulations on bull trout.

3.4.1 Evaluate effects of existing and proposed angling regulations on bull trout. Evaluate the impacts of rapidly increasing angler pressure on adequacy of angling regulations to protect bull trout, unintentional mortality and other angler-related issues affecting bull trout. Target the most heavily fished waters such as Kelly Creek, Lochsa River and main tributaries, and lower Selway River.

3.4.2 Evaluate the impact of the sport fishing season in the two Fish Lake core areas on the adfluvial bull trout populations. The North Fork Clearwater Fish Lake sport season for cutthroat trout opens August 1 and closes in mid-fall. The Lochsa Fish Lake sport season is a general season. Both lakes draw heavy recreational pressure, and heavy fishing pressure. The impacts of these sport seasons on bull trout spawning, and illegal and hooking mortality should be investigated and appropriate actions taken if recovery of bull trout is impacted.

3.4.3 Evaluate the impact of the bonus brook trout limit in the Clearwater River Recovery Unit and increase the limit, if possible. Investigate the result of the increased brook trout limit on reducing populations and limiting expansion of brook trout. Maintain these regulations and increase the limit where necessary to achieve objectives of removing brook trout competition and hybridization threats to bull trout recovery.

4 Characterize, conserve, and monitor genetic diversity and gene flow among local populations of bull trout.

4.1 Incorporate conservation of genetic and phenotypic attributes of bull trout into recovery and management plans.

4.1.1 Conduct a genetic inventory. Collect samples for genetic analysis to contribute to establishing a program to understand the genetic baseline and monitor genetic changes throughout the range of bull trout (see Chapter 1 narrative). Collect genetic samples from known spawning and rearing streams (local populations), with priority given to populations where hybridization with brook trout presents the most imminent threat. Evaluate genetic diversity and the extent of hybridization. This information will be valuable for the conservation of the species across its range, and if local populations are extirpated within the Clearwater River Recovery Unit, this research may indicate what population may be best for future reintroduction efforts. Incorporate information and recommendations into management plans.

4.1.2 Describe and monitor genetic and phenotypic characteristics of bull trout in all core areas, and incorporate information into management strategies. The interaction of bull trout genetic composition with particular environments results in phenotypic diversity and perhaps local adaption. Such information for particular groups of bull trout and their habitat should be generated for all core areas in the Clearwater River Recovery Unit, and incorporated into management strategies to improve their effectiveness. Develop a phenotypic and/or morphometric key to separate, if possible, resident from fluvial or adfluvial bull trout.

4.2 Maintain existing opportunities for gene flow among bull trout populations.

4.2.1 Investigate additional opportunities to improve passage. Utilize information from task 4.1.1 to maintain current genetic interchange between local populations and core areas. Conduct further surveys to identify passage barriers that may inhibit genetic interchange; priority areas include the South Fork Clearwater and Lochsa River core areas. Annually monitor "problem areas" where recreationists construct man-made check dams to create swimming holes (*i.e.*, American River and Lolo Creek-Woodland Bridge area). These unauthorized dams may block fish passage if not removed. Coordinate with management agencies to retain existing connectivity as management actions are planned by preventing the establishment of barriers (*e.g.,* structural barriers or unsuitable habitat conditions), that may inhibit the movement of bull trout within the Clearwater River Recovery Unit.

4.3 Develop genetic management plans and guidelines for appropriate use of transplantation and artificial propagation.

4.3.1 Evaluate the need for reestablishing genetic connectivity between the North Fork Clearwater River and the remainder of the recovery unit. Based on research determinations of the degree of genetic isolation between the North Fork Clearwater and the Lochsa, Selway and South Fork Clearwater bull trout local populations and related management recommendations (Task 4.1.1), evaluate the need for re-establishing the connection between these subbasins. If connection is needed, investigate fish passage opportunities downstream and upstream over Dworshak Dam. Evaluate the potential for a trap and transport facility at the base of the dam for upstream migrants and at the head of the reservoir for downstream migrants.

5 Conduct research and monitoring to implement and evaluate bull trout recovery activities, consistent with an adaptive management approach using feedback from implemented, site-specific recovery tasks.

5.1 Design and implement a standardized monitoring program to assess the effectiveness of recovery efforts affecting bull trout and their habitat.

5.1.1 Develop coordination infrastructure to facilitate restoration. Restoration efforts in the Clearwater River Recovery Unit do not appear to be well coordinated among the various agencies and publics. No forum for the exchange of restoration information, projects, and strategies appears to be in place. Existing work groups such as the Clearwater Basin Advisory Group should consider opportunities for facilitating the establishment of a group to coordinate the restoration in the recovery unit. Develop a GIS database to track progress on implementation of recovery tasks, and data collected from bull trout inventories, monitoring, and research. These would be accessible to all participating entities and managed by a central party (*e.g.*, Idaho Department of Fish and Game, Conservation Data Center). Coordinate development of this database with Bonneville Power Association's Restoration Tracking Program, currently in development.

5.1.2 Implement the population monitoring strategy identified for the Clearwater River Recovery Unit. Implement the initial monitoring strategy and revise the strategy as necessary under the principles of adaptive management. Add a monitoring component for the potential local populations that are identified as essential for recovery.

5.2 Conduct research evaluating relationships among bull trout distribution and abundance, bull trout habitat, and recovery tasks.

5.2.1 Determine the abundance of fluvial, adfluvial, and resident bull trout and habitat used in the Clearwater River Recovery Unit. Continue implementation of existing bull trout population abundance and distribution studies, and initiate new studies. Identify and map the extent of habitat utilized by each local population. For fluvial bull trout, continue to determine spawning and wintering habitat and migratory pathways. Conduct studies similar to those ongoing in the North Fork Clearwater River and throughout the recovery unit. Priority areas include local populations identified in Table 2.

5.2.2 Develop and implement protocol to estimate the mortality factors for local populations. Evaluate the factors comprising total annual mortality for local populations and use this information to refine current understanding of threat and risk for local populations. Revise recovery management strategies and actions for local populations to include this research, according to principles of adaptive management.

5.2.3 Map spawning habitat. Develop a comprehensive map of primary bull trout tributary spawning reaches in all core areas within the Clearwater River Recovery Unit, for focusing habitat protection and recovery efforts.

5.2.4 Conduct presence/absence surveys in previously uninventoried areas. Areas of the Clearwater River Recovery Unit, especially wilderness areas, have not yet been fully inventoried. Utilize survey protocols that can assign confidence limits to survey results. Balance the need to have statistically significant survey results with the difficulty of accessing remote areas for the surveys. Priority areas include the Selway-Bitterroot and Gospel Hump wilderness areas and priority areas designated by local biologists.

5.2.5 Evaluate water temperature as a limiting factor. Determine the range of temperature tolerances for bull trout life stages in different local populations and habitats within the Clearwater River Recovery Unit. Evaluate the suitability of temperature regimes in currently occupied and potential bull trout habitat. Identify potential thermal migration barriers within the recovery unit.

5.2.6 Identify suitable unoccupied habitat. Identify suitable unoccupied habitat in the Clearwater River Recovery Unit that might be reconnected or enhanced to increase recruitment of bull trout to the system. Within five years complete a comprehensive list of all known passage barriers blocking access to suitable habitat by upstream migrating bull trout. Consider establishment of resident bull trout populations upstream from natural barriers to provide a genetic reserve.

5.2.7 Evaluate importance of contributing waters. Evaluate the importance and contribution to bull trout recovery of streams with only incidental bull trout presence. Develop a management strategy for contributing waters that are determined to negatively impact occupied (local populations) or necessary core habitat (potential local populations). Include strategy in overall Clearwater Recovery Unit bull trout management plan (Task 3.1.1).

5.3 Conduct evaluations of the adequacy and effectiveness of current and past best management practices in maintaining or achieving habitat conditions conducive to bull trout recovery.

5.3.1 Evaluate existing Best Management Practices to determine if they provide for conditions necessary for bull trout recovery. Continue and expand monitoring of compliance and effectiveness of Idaho Best Management Practices to ensure they are implemented as described in the Idaho Forest Practice

Act. Recommend adjustments to and revise Best Management Practices to correct any documented deficiencies where those practices provide inadequate protection to bull trout on State and private lands. Priority areas include: the upper Lochsa River core area; the South Fork Clearwater River core area; the Beaver Block, Floodwood Creek, Little North Fork River, Moose and Chamberlain creeks in the North Fork Clearwater River core area; and the Lower/Middle Fork Clearwater core area, particularly Clear and Lolo Creek drainages.

5.4 *Evaluate the effects of diseases and parasites on bull trout, and develop and implement strategies to minimize negative effects.*

5.5 Implement research and monitoring studies to improve information concerning the distribution and status of bull trout, as described in Chapter 1.

5.5.1 Conduct migrational studies for the Clearwater River Recovery Unit and coordinate with the Hells Canyon Complex, Grande Ronde, Imnaha, and Salmon River recovery units. This information is necessary to provide a more complete understanding of adult bull trout habitat requirements, and the interrelationship of fluvial populations between the recovery units.

5.6 Identify evaluations needed to improve understanding of relationships among genetic characteristics, phenotypic traits, and local populations of bull trout.

5.6.1 Determine the life history requirements of resident and migratory bull trout populations. The recovery unit has both resident and migratory (fluvial) local populations. An understanding of the life history habitat requirements and interactions of resident and fluvial fish will assist with

identification of recovery of bull trout in the Clearwater River basin.

6 Use all available conservation programs and regulations to protect and conserve bull trout and bull trout habitat.

6.1 Use partnerships and collaborative processes to protect, maintain, and restore functioning core areas for bull trout.

6.1.1 Provide long-term protection of perennial stream reaches. Work cooperatively with private landowners and the Natural Resource Conservation Service to provide voluntary incentives for long-term habitat protection. Some habitat important for bull trout recovery, especially migratory, foraging, and overwintering habitat, occurs on private lands and may need protection to maintain conditions conducive to bull trout recovery. A variety of cooperative arrangements could be made with landowners to protect and restore habitat on their land. Where possible combine efforts for bull trout with anadromous fish recovery efforts. Initial emphasis should be placed on identified bull trout spawning and rearing streams. Priority areas include Red and American Rivers and Newsome Creek (South Fork Clearwater River core area); Brushy Fork, Spruce, Twin, Crooked Fork, Legendary Bear, and Colt Killed creeks; Floodwood Creek; Beaver Creek (North Fork Clearwater River core area); and Clear and Lolo creeks (Middle/Lower Clearwater River core area).

6.1.2 Work collaboratively with county and city land use planners to minimize urbanization impacts on bull trout recovery. County and city land use planning provides an opportunity to minimize urbanization and development impacts and help mitigate development to sustain existing aquatic species.

6.1.3 Identify opportunities for habitat restoration and provide assistance to landowners. Some important bull trout habitat occurring on private land may require restoration to re-establish adequate conditions. Expand current efforts to work with landowners to identify opportunities for restoration and provide increased technical assistance; use existing Federal, State, and Tribal cost-share programs and Farm Bill programs such as the Conservation Reserve Program and Wetland Reserve Program to implement actions.

6.1.4 Integrate watershed restoration efforts on public and private lands. Integrate watershed analyses and restoration activities on public lands in the headwaters and private lands, which occur primarily lower in the watershed, to ensure that activities maximize benefits and are complementary to bull trout restoration (*e.g.*, upper Lochsa River checkerboard ownership areas, and Red, American, and Crooked Fork Rivers).

6.1.5 Encourage floodplain protection. Encourage local and State governments to develop, implement, and promote floodplain and lakeshore protection regulations in Clearwater and Idaho counties to mitigate habitat loss and stream encroachment from rural residential development throughout the Clearwater River drainage. Development is of particular concern in watersheds that support bull trout spawning and rearing as it exacerbates temperature problems, increases nutrient loads, decreases bank stability, and alters instream and riparian habitat.

6.2 Use existing Federal authorities to conserve and restore bull trout.

6.2.1 Implement the Plum Creek Habitat Conservation Plan. Carry out compliance monitoring and U.S. Fish and Wildlife Service commitment to adaptive management planning under the Plum Creek Native Fish Habitat Conservation Plan; primarily applicable to waters of the upper Lochsa River.

6.2.2 Coordinate bull trout recovery with listed anadromous fish species recovery. The Clearwater River Recovery Unit team will coordinate the implementation of bull trout recovery actions with salmon and steelhead measures to avoid duplication and maximize the use of available resources. Coordination would occur initially with National Marine Fisheries Service since they are responsible to salmon and steelhead recovery. Coordination with other agencies responsible for implementation of recovery actions would follow.

6.3 Enforce existing Federal, State, and Tribal habitat protection standards and regulations and evaluate their effectiveness for bull trout conservation.

6.3.1 Ensure restrictions on suction dredge mining in bull trout habitat are effective. Evaluate compliance with and effectiveness of restrictions in protecting bull trout habitat and modify to improve effectiveness as necessary. Priority areas include Moose and Chamberlain creeks, and other active suction dredge permits that overlap occupied bull trout habitat in the North Fork and South Fork Clearwater core areas.

6.3.2 Ensure current mining regulations are effective. Evaluate compliance with and effectiveness of regulations in protecting bull trout habitat and modify to improve effectiveness as necessary. Priority areas include occupied bull trout habitat in the South and North Fork Clearwater core areas.

7 Assess the implementation of bull trout recovery by recovery units, and revise recovery unit plans based on evaluations.

7.1 Convene annual meetings of each recovery unit team to review progress and generate a report on recovery plan implementation for the Fish and Wildlife Service.

7.1.1 Develop a Participation Plan. Develop a Participation Plan for all State, Federal, Tribal, industry, and private stakeholder involvement to support implementation in the Clearwater River Recovery Unit. Invite current Clearwater Watershed Advisory Group (WAG) to begin initial discussions on how to develop a Participation Plan. Expand the scope of participants and planning process based on the Watershed Advisory Group's recommendations.

7.2 *Assess effectiveness of recovery efforts.*

7.3 Revise scope of recovery as suggested by new information.

7.3.1 Periodically review progress toward recovery goals and assess recovery task priorities. Annually review progress toward population and adult abundance criteria and recommend changes, as needed, to the Clearwater River Recovery Unit chapter. In addition, review tasks, task priorities, completed tasks, budget, time frames, particular successes, and feasibility within the Clearwater River Recovery Unit.